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EXAMINER

FIORIELLA CHRISTOPHER A

ART UNIT

PAPER NUMBER

1731

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.	Applicant(s)	
09/975,262	MIYAKAWA, NAOMICHI	
Examiner	Art Unit	
Christopher A. Fiorilla	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 5, 6, 9-12, 15, 17 and 19-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 5, 6, 9-12, 15, 17, 19-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-945)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,2,5,9-12,17,19,20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niwa et al. (5,688,728) in view of Apte et al. (5,902,429).

Niwa et al. teaches the production of a porous ceramic article. The process of Niwa et al. includes the steps of:

heat treating in nitrogen (col. 7, line 27) a green body comprising:

silicon nitride particles having an average particle diameter of from 1 to 30  $\mu\text{m}$  (col. 5, lines 1-2),

metal oxide hollow particles (e.g. col. 4, line 66) or polymeric particles (col. 8, line 66-67),

metal oxide solid particles (col. 7, lines 39-42).

Niwa et al. also discloses the claimed oxide materials, i.e. Al-containing (e.g. col. 5, line 39), the use of acrylic resin (e.g. col. 9, line 2), the claimed porosity, and the claimed pore diameter (e.g. col. 4, lines 52-54). Further, Niwa et al. discloses the desirability of spherical pores and pore forming agents (e.g. col. 5, lines 51-54 and col. 8, line 42).

Apte et al. discloses that pore sizes and shape are determined by the size and shape of an added pore forming agent (col. 4, lines 8-12). It would have been obvious to one having ordinary skill in the art at the time of the invention to add pore forming agents that would

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produce the pore size and configurations as disclosed by Niwa et al. (5,688,728) in view of the disclosure in Apte et al.

3. Claims 6 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niwa et al. (5,688,728) in view of Apte et al. (5,902,429) as applied to claims 1,2,5,9-12,17,19,20 and 21 above, and further in view of Watanabe et al. (5,833,917).

Watanabe et al. (5,833,917) teaches sintering silicon nitride at 1700-2000°C for 1-8 hours (col. 5, lines 6-15). It would have been obvious to one having ordinary skill in the art at the time of the invention to sinter the silicon nitride of Niwa et al. in view of the generic disclosure therein.

4. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niwa et al. (5,688,728) in view of Apte et al. (5,902,429) as applied to claims 1,2,5,9-12,17,19,20 and 21 above, and further in view of Wise et al. (5,783,297).

Wise et al. teaches hollow particles (e.g. col 2, lines 56-60) which have a porosity of 55% (e.g. col. 6, line 3). It would have been obvious to one having ordinary skill in the art at the time of the invention to use hollow particles having such a porosity in the process of Niwa et al. in view of the generic disclosure therein.

5. Applicant's arguments filed 3/11/04 have been fully considered but they are not persuasive.

With respect to the rejection of the claims under 35 USC 103 applicants argue:

The Niwa et al patent, as stated previously, discloses a porous ceramic product that possesses thermal shock resistance. The product is prepared by heating a raw material ceramic powder that is selected from a group of materials including silicon nitride. In the thermal process of forming the porous ceramic product, hollow oxide particulate material is used as the means of introducing porosity into the ceramic product obtained. The sintered product obtained is used as a valve unit that has high durability. The claims of the present invention, however, are clearly distinguished over the reference on the basis that the silicon nitride filter is directed to the specific aspect of being effective in the filtering of particulates from diesel fuel. A point to be made is that the sintered ceramic body of the reference that is useful as a mechanically working device, i.e., a valve unit of a faucet, must have certain strength characteristics to function mechanically in the intended manner. On the other hand, because the silicon nitride product of the present invention functions as a filter, it does not have to have the mechanical properties of the ceramic of the patent, but clearly must have an established degree of porosity if it is to effectively function as a filter. Accordingly, the present claims recited that the porosity of the silicon nitride product must range from 30 to 80 % and that the ave pore diameter must range from 5 to 40  $\mu\text{m}$ , preferably from 5 to 20  $\mu\text{m}$ . On the other hand, applicants submit that the teachings of the reference as to porosity and ave pore diameter in the patent do not lead one of skill to the porosity/ave pore diameter combination of the present claims. That is, at the most, there is only a 10 % overlap of porosity ranges of the present claims and the disclosure of the reference, which overlap disappears at the preferred porosity of the ceramic of the patent at 2 to 20 %. Further, this overlap is in the context of an ave pore diameter in the patent of 5 to 300  $\mu\text{m}$ , preferably 20 to 250  $\mu\text{m}$ , while in the invention the ave pore diameter must range as described above. (Note that inconsistency exists in the disclosure of ave pore diameter in the reference between the proclaimed range of 5 to 300  $\mu\text{m}$  and the commentary in the paragraph bridging columns 4 and 5 where it is stated that the ave pore diameter is larger than the ave particle sizes of the hollow particles of 20 to 250  $\mu\text{m}$  and the ceramic particles of 1 to 20  $\mu\text{m}$ , meaning that at a minimum the ave pore diameter of the ceramic product must be greater than 21  $\mu\text{m}$  at a minimum. This is inconsistent with the disclosed range of 5 to 300  $\mu\text{m}$ . Thus, the reference is not believed to suggest the ave pore diameter/porosity limitation of the present claims.

These arguments are not persuasive. First, it has not been established by applicant that the product produced by Niwa et al. does not exhibit the claimed properties. The reference discloses the claimed materials and claimed porosities and thus it is presumed to have the same functionality. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are

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produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). See MPEP 2112.01. Secondly, as applicant admits above, both the claimed porosity and average pore size ranges overlap with what is disclosed by Niwa et al. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Finally, note that the inconsistency alleged by applicant is not believed to be accurate. It is submitted that the paragraph bridging cols. 4-5 indicates that the pores are larger than that ceramic particles not larger than the hollow particles.

Applicants again maintain that an important distinction between the present process as claimed in Claim 1 and the patent is that the pore-forming substance is spherical organic polymer particles of a size ranging from 20 to 100  $\mu\text{m}$ , whereas the patent clearly teaches hollow metal oxide particles as the pore forming agent. The particles are disclosed as having a size in the range from 20 to 250  $\mu\text{m}$  order to introduce the appropriate porosity into the product. In fact, the patent teaches in the Experiment of columns 8 and 9 and in Table 1 that hollow metal oxide particles produce a product that is superior for the purposes of the patent in producing a valve unit than the use of various resin particles of about 100  $\mu\text{m}$  in size in producing a ceramic product. This fact is demonstrated by the sliding durability data and the thermal shock resistance data of Table 1. On the other hand, for the purposes of the present invention of producing a silicon nitride product where porosity and ave pore diameter are important as factors in the use of the product as a filter, the use of certain resin particles of the size range stated is acceptable. Thus, the use of certain resin particles as a component of a green body to produce the article of the present invention is quite satisfactory, which is something that one of skill in the art would not perceive from the disclosure of Niwa et al. Accordingly, the patent does not teach or suggest the method embodiments of the invention. While the Apte et al patent discloses various organic materials as pore forming agents, nevertheless it is clear from the fact that Niwa et al teaches that particulate organic materials are unsatisfactory as pore forming materials, that one of skill would not use the organic materials taught by Apte et al in the method of Niwa et al. Moreover, the ceramic preform of the patent which has a graded microporosity and has a metal activator embedded therein is clearly not useful as a filter of the likes of diesel fuel and therefore the preform of the patent does not meet the porosity

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**and average pore diameter limitations of the present claims. Accordingly, the combined references do not suggest the process of present Claim 1.**

These arguments are not persuasive. It is well settled that a reference must be considered for not only what it expressly teaches, but also for what it fairly suggests and that the entirety of the reference disclosure, including unpreferred embodiments must be considered in determining obviousness. *In re Burckel* 592 F.2d 1175, 201 USPQ 67; *In re Lamberti* 545 F.2d 747 USPQ 278.

As to the method of Claim 9 wherein a component of the materials that are used to form the green body that is subsequently heat treated to form a porous silicon nitride product is hollow metal oxide particles, neither reference teaches or suggests the combination of porosity and average pore diameter features that is necessary to form a silicon nitride body that has useful liquid filtering characteristics.


As to Watanabe et al, which discloses silicon nitride sintering temperatures, such disclosure is pertinent to a secondary aspect of the claimed invention upon which patentability does not depend. Accordingly, withdrawal of the rejection over the combined three patents of record of Claims 6 and 15 which depend upon patentable claims is respectfully requested.

These arguments are not persuasive for the reasons as set forth above.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher A. Fiorilla whose telephone number is (571) 272-1187. The examiner can normally be reached on M-F, 6:30am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christopher A. Fiorilla  
Primary Examiner  
Art Unit 1731

caf